AMENDMENTS TO THE CLAIMS

Cancel Claim 15 without prejudice. Please accept amended Claims 1 and 8-14 as follows:

1. (Currently Amended) A method for computing payment discounts awarded to <u>a plurality of</u> winning agents in an exchange, said method comprising:

computing a Vickrey discount to ~~each~~ said <u>plurality of</u> winning ~~agent~~ <u>agents</u> as the difference between available surplus with all agents present minus available surplus without said <u>plurality of</u> winning ~~agent~~ <u>agents</u>; and

computing said payment discounts by adjusting said Vickrey discounts so as to constrain said exchange to budget-balance.

2. (Original) The method of claim 1 wherein said adjusting step further comprises:

selecting a distance function comprising a metric of the distance between said payment discounts and said Vickrey discounts;

minimizing said distance function under said budget-balance constraint and one or more bounding constraints;

deriving a parameterized payment rule for said distance function;

determining an allowable range of parameters so as to maintain budget-balance; and

selecting values for said parameters within said allowable range.

3. (Original) The method of claim 2 wherein said values for said parameters are selected within said allowable range so as to minimize agent manipulation.

4. (Original) The method of claim 2 wherein said bounding constraints comprises a constraint that said payment discounts be non-negative.

5. (Original) The method of claim 2 wherein said bounding constraints comprises a constraint that said payment discounts not exceed said Vickrey discounts.

6. (Original) The method of claim 2 wherein said distance function is selected from:

$$L_2(\Delta,\Delta^V) = \left(\Sigma_l\left(\Delta_l^V - \Delta_l\right)^2\right)^{1/2},$$

$$L_\infty(\Delta,\Delta^V) = \max_l\left|\Delta_l^V - \Delta_l\right|,$$

$$L_{RE}(\Delta,\Delta^V) = \Sigma_l\left(\Delta_l^V - \Delta_l\right)/\Delta_l^V,$$

$$L_\pi(\Delta,\Delta^V) = \Pi_l\Delta_l^V/\Delta_l,$$

$$L_{RE2}(\Delta,\Delta^V) = \Sigma_l\left(\Delta_l^V - \Delta_l\right)^2/\Delta_l^V, \text{ and}$$

$$L_{RE}(\Delta,\Delta^V) = \Sigma_l\Delta_l^V\left(\Delta_l^V - \Delta_l\right).$$

7. (Original) The method of claim 6, wherein said parameterized payment rule comprises:

a Threshold Rule $\max(0,\Delta_l^V - C)$, $C \geq 0$ if said selected distance function is $L_2(\Delta,\Delta^V)$ or $L_\infty(\Delta,\Delta^V)$;

a Small Rule Δ_l^V if $\Delta_l^V \leq C$, $C \geq 0$ if said selected distance function is $L_{RE}(\Delta,\Delta^V)$;

a Reverse Rule $\min(\Delta_l^V,C)$, $C \geq 0$ if said selected distance function is $L_\pi(\Delta,\Delta^V)$;

a Fractional Rule $\mu\Delta_l^V$, $0 \leq \mu \leq 1$ if said selected distance function is $L_{RE2}(\Delta,\Delta^V)$; and

a Large Rule Δ_l^V if $\Delta_l^V \geq C$, $C \geq 0$ if said selected distance function is $L_{RE}(\Delta,\Delta^V)$.

8. (Currently Amended) A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for computing payment discounts awarded to a plurality of winning agents in an exchange, said method steps comprising:

computing a Vickrey discount to ~~each~~ said plurality of winning ~~agent~~ agents as the difference between available surplus with all agents present minus available surplus without said plurality of winning ~~agent~~ agents; and

computing said payment discounts by adjusting said Vickrey discounts so as to constrain said exchange to budget-balance.

9. (Currently Amended) The ~~apparatus~~ method of claim 8 wherein said adjusting step further comprises:

selecting a distance function comprising a metric of the distance between said payment discounts and said Vickrey discounts;

minimizing said distance function under said budget-balance constraint and one or more bounding constraints;

deriving a parameterized payment rule for said distance function;

determining an allowable range of parameters so as to maintain budget-balance; and

selecting values for said parameters within said allowable range.

10. (Currently Amended) The ~~apparatus~~ method of claim 9 wherein said values for said parameters are selected within said allowable range so as to minimize agent manipulation.

11. (Currently Amended) The ~~apparatus~~ method of claim 9 wherein said bounding constraints comprises a constraint that said payment discounts be non-negative.

12. (Currently Amended) The ~~apparatus~~ method of claim 9 wherein said bounding constraints comprises a constraint that said payment discounts not exceed said Vickrey discounts.

13. (Currently Amended) The ~~apparatus~~ method of claim 9 wherein said distance function is selected from:

$$L_2(\Delta,\Delta^V) = \left(\Sigma_l\left(\Delta_l^V - \Delta_l\right)^2\right)^{1/2},$$

$$L_\infty(\Delta,\Delta^V) = \max_l\left|\Delta_l^V - \Delta_l\right|,$$

$$L_{RE}(\Delta,\Delta^V) = \Sigma_l\left(\Delta_l^V - \Delta_l\right)/\Delta_l^V,$$

$$L_\pi(\Delta,\Delta^V) = \Pi_l\Delta_l^V/\Delta_l,$$

$$L_{RE2}(\Delta,\Delta^V) = \Sigma_l\left(\Delta_l^V - \Delta_l\right)^2/\Delta_l^V, \text{ and}$$

$$L_{RE}(\Delta,\Delta^V) = \Sigma_l\Delta_l^V\left(\Delta_l^V - \Delta_l\right).$$

14. (Currently Amended) The ~~apparatus~~ method of claim 13, wherein said parameterized payment rule comprises:

a Threshold Rule $\max(0,\Delta_l^V - C)$, $C \geq 0$ if said selected distance function is $L_2(\Delta,\Delta^V)$ or $L_\infty(\Delta,\Delta^V)$;

a Small Rule Δ_l^V if $\Delta_l^V \leq C$, $C \geq 0$ if said selected distance function is $L_{RE}(\Delta,\Delta^V)$;

a Reverse Rule $\min(\Delta_l^V, C)$, $C \geq 0$ if said selected distance function is $L_\pi(\Delta,\Delta^V)$;

a Fractional Rule $\mu\Delta_l^V$, $0 \le \mu \le 1$ if said selected distance function is $L_{RE2}(\Delta,\Delta^V)$; and

a Large Rule Δ_l^V if $\Delta_l^V \ge C$, $C \ge 0$ if said selected distance function is $L_{RE}(\Delta,\Delta^V)$.

15. (Cancelled)